BARUCH, (SIMON.)

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NEW YORK.

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ATTENDING PHYSICIAN TO THE MANHATTAN GENERAL HOSPITAL AND THE NEW YORK JUVENILE ASYLUM.

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TREATMENT OF TYPHOID FEVER.

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I DESIRE to confine my remarks to the treatment of typhoid fever, because I have recently revised my experience, with the result of reaching some decided views, which differ radically from those advocated here to-day, as well as from those entertained by the profession generally in this country, and, up to a recent period, by myself also. These views are the result of mature deliberation and sifting of evidence afforded by clinical and experimental data obtained from various sources and compared with my own.

The various methods of treatment advocated during my professional career of thirty years are doubtless familiar to you. About ten years ago I had settled upon the Ziemssen graduated cold-bath treatment as the most promising, and I obtained more satisfactory results from it than from any other. Still, when other antipyretic methods came into vogue, with so much promise of success based upon the idea that the reduction of high temperature was the chief desideratum, it was natural for me to be carried away upon the tide which so completely swept over the profession, especially as the treatment by cold baths involved so much trouble, and proved so disagreeable to many patients and their friends. Gradually the milder forms of bathing, by wet-pack and sponging, with quinine, thallin, kairin, antipyrin, the ice-coil, and later antifebrin and phenacetin, have assumed potent sway over the profession.

A review of my experience in the last decennium, derived from personal observation in private and hospital practice, and in that of many colleagues, as well as from society discussions, develops the fact that the mortality of typhoid fever has not been reduced by the antipyretic method of treatment. I ask you to follow me carefully in a fair, conscientious, and exhaustive, yet brief, review of the re-

sults of the various methods in vogue during the past twenty-five years, and to compare it, as I have done for myself, with your own experience. You will then, I opine, agree with me that we stand to-day upon the threshold of a great epoch in the treatment of typhoid fever.

You have heard how fatal is typhoid fever at the present time, and I might offer you additional evidence by statistics I have gathered from the New York City Board of Health, from 1876–1885, during which time 7712 cases of typhoid fever had been reported, with a mortality of 3184, or 41.28 per cent. But as these statistics may be doubted by some, I will quote to you the mortality of typhoid fever in the New York hospitals, as stated by Dr. Delafield in 1885, which he has computed at 24.66 per cent. This mortality is even larger than that furnished by the recently gathered careful statistics in Germany, which show that, under the expectant treatment, of 11,124 cases the mortality amounted to 21.7 per cent. These statistics, to which others may readily be added, were they not sufficiently large, present to us the appalling fatality of typhoid fever under the now prevalent expectant, antipyretic plan, which seeks, by nourishing the patient, placing him in good hygienic surroundings, combating complications, and reducing the temperature, to conduct him to a safe issue. Much stress has, as you are aware, been placed during the past quarter of a century upon high temperature, as the predominating element of danger in typhoid fever. It has been claimed that parenchymatous degeneration of the heart, kidneys, and other organs was the direct result of prolonged high temperature, and the chief energy of therapeusis was expended upon this hydra-headed monster. This idea was indeed sustained by, if it did not originate in, the marvellous success of the cold-bath treatment, which Brand, of Stettin, brought before the profession in Germany, and which was adopted, after some modification, by Liebermeister, the high-priest at the altar of antipyresis, as well as by Jürgensen, Ziemssen, and others.

The history of this special subject is indeed instructive, inasmuch as it illustrates how surely bedside experience will, sooner or later, demolish the most stately structures erected by theoretical reasoning. Brand never claimed that this bath treatment was chiefly directed against the high temperature. On the contrary, this was a secondary object with him. Liebermeister's criticism (*Handbook of General Therapeutics*, William Wood & Co., 1885) is at once its best expo-

sition and the highest encomium of Brand's method. On page 15 he says:

"The work of Brand, which was published in 1861, ranks high above the level of the publications of the professional hydropathists of to-day. Still the author occupies prétty much the ground of Priessnitz. The preëminent importance of abstraction of heat is not sufficiently recognized; the main action of water is more that of stimulation," etc.

Now I propose to show that the standpoint of Brand is correct to-day, and that it is sustained by the most incontrovertible evidence of experimental study, seconded by clinical experience gathered from carefully recorded data. A few days ago I heard a faithful adherent of drug medication remark that it is singular how antipyretics are falling into disuse. Thinking men are, indeed, beginning to ask themselves the question: Has the introduction of these powerful antipyretics reduced the mortality of typhoid fever? Two years ago I answered this question in the New York Academy of Medicine, affirmatively, but I stated my belief that the small improvement was attributable to the comfort afforded the patient more than to the removal of danger from high temperature. To-day, after an exhaustive review of the whole subject, I am prepared to agree with Brand, that the only advantage from antipyretic medication seems to be that the patient is able to die with a nearly normal temperature. The fact that the statistics of private and hospital practice show a mortality reaching beyond 24 per cent. since the introduction and abundant use of antipyrin and its substitutes, proves their inadequacy. And the fact becomes more glaring when statistics of the cold-water treatment reveal the astounding reduction of mortality to 3.9 per cent. We have reached a point in the study of this subject, so wrought with deepest interest, when it is our solemn duty to pause, weigh the reasons of this enormous difference in the mortality, and to ascertain if it may not be reduced. The purpose of this effort is to establish the fact that this mortality may be reduced by adopting the cold-bath treatment, and that it may even be reduced, as Brand has reduced it, to 1 per cent.! Those who, like myself, have personally witnessed the fatality of typhoid fever in our city, may, as I once did, shrug their shoulders in doubt. But if you will follow me in a brief analysis of the reasons for the faith that is in me, I hope to convince you that this is not a chimera, but a substantial fact based upon the most reliable clinical data.

Brand offers the statistics of 19,017 carefully gathered cases of typhoid fever (*Deutsche med. Wochensch.*, 1887), which demonstrate that under the general influence of all kinds of cold-bath treatment, without, however, its strict enforcement, the mortality has been reduced from 21.8 per cent. to 7.8 per cent. But this is not all. As I have said in a recent paper read before the New York County Medical Society, Brand has obtained from twenty-three German and French distinctly designated sources, the reports of 5573 cases, statistical evidence which has not yet and cannot be controverted, and by which it is clearly shown that the cold-bath treatment originally recommended by him has reduced the mortality to 3.9 per cent. The latter, however, still contains many imperfectly managed cases. Eliminating these, the number treated strictly by Jürgensen, Vogl, Brand, and others, up to January, 1887, amounted to 1223 cases, of which 12 died, a mortality of 1 per cent. And yet this is not all, for the most significant fact deducible from these statistics remains to be told. Not a single one of these twelve deaths occurred in any case that came under treatment before the fifth day.

Brand boldly asserts, on the strength of these 1223 cases, of which he treated one-fourth in private practice, the remainder coming from Jürgensen's hospital at Tübingen, Vogl's at Munich, and the military hospitals at Stralsund and Stettin, that all cases of typhoid fever coming under treatment before the fifth day should recover. Medical statistics are proverbially unreliable, but the exactness of the figures presented by Brand, in his able polemic in the *Deutsche med. Wochenschrift* for 1887, cannot be doubted, nor the deductions gainsaid, because they are furnished from civil and military life, from university clinics and military hospitals, in which the cases were observed by competent and well-trained men.

Valuable as these statistics must be as an argument in favor of strict cold bathing, the results of the latter are better illustrated by some comparative statistics made by several clinical observers. For instance, the official records of the Second Prussian Army Corps, quoted by Brand, show that while, from 1849 to 1866, the mortality among 1970 cases was 26.3 per cent., it was reduced, among 2711 cases of strict cold-bath treatment, to 4.3 per cent. This enormous reduction is the more glaring when this mortality of 4.3 per cent. is compared to that of other armies; in the French Army it was 32.2 per cent.; in the Italian, 28.6 per cent.; in the Austrian,

27.4 per cent.; and in the English, 23.8 per cent., during the same period. Indeed, so striking was the reduction of mortality wrought by this treatment in the German military hospitals, that the Prussian War Department deemed it incumbent upon itself to issue, on January 25, 1883, a circular to the medical service, in which it was urged that, inasmuch as the Brand treatment has been instrumental in reducing the mortality of typhoid fever in the various hospitals from 25 per cent. to 8 per cent., "we are justified in expecting that, with an increased perfection and more general adoption of this treatment, it may become possible to save a still larger number of sick men."

AVERAGE MORTALITY UNDER VARIOUS METHODS OF TREATMENT IN TYPHOID FEVER.

Reporter.	Source.	Treatment.	Number of cases.	Percentage of mortality.
Brand,	Various sources	Expectant	11,124	21.7
Delafield,	New York Hospital, 1878–83	Mixed expectant	1,305	24.66
Brand,	Various sources	All kinds of cold baths . .	19,017	7.8
Tripier, Bouveret, and Teissier,	Red Cross Hospital, Lyons:			
	1866–77	Expectant	229	26.2
	1873–81	Intermediate	629	16.5
	1882–87	Exclusive cold baths in severe cases.	376	6.9
	1887	Strict cold bathing . . .	139	5.0
Vogl,	Military Hospital, Munich:			
	1841–68	Without water, expectant(?)	5,484	20.7
	1868–81	Intermediate, with water .	2,841	12.2
	1875–81 (Second Division)	Baths and antipyretics . .	702	7.6
	1880	Strict cold baths	428	2.7
	1882–87	Strict cold baths	141	3.5
	1882–87 (Second Division)	Increasing baths and abolition of antipyretics.	144	4.1
Ziemssen,	Tübingen University, Clinic for 1877–87.	Graduated cold baths and antipyretics.	2,000	9.6
Naunyn,	Königsberg University Clinic	Strict cold baths	145	6.9
Brand,	Collected from various sources	Strict cold baths	2,198	1.7
Brand,	Same cases omitting those not treated before the fifth day.	Strict cold baths	2,150	0.0

The preceding table, which I have gathered with care to exclude all unreliable statistics, presents at a glance the comparative merits of the various methods of treatment.

The above figures astounded me when I sought them out, and I trust they will impress the lesson they teach indelibly upon your minds.

But I do not ask you to accept this statistical evidence alone,

although you will doubtless concede that never in the history of medicine have statistics of such magnitude, from such reliable and diversified sources, been brought to bear upon a question of therapeutics.

Let us divest ourselves of the empirical influence of mere figures, which, it has been said, may be marshalled in any cause to prove anything, and study the reason why the cold-bath treatment of typhoid fever is superior to the antipyretic expectant plan.

In the first place, the idea that high temperature is the chief determining cause of fatality in typhoid fever must now be abandoned. The sooner we cut loose from this bugbear the better for suffering humanity. I am glad that Dr. Burt has taken strong ground on this subject. Rather than enter upon an elaborate discussion of the present status of the question, I will refer you to the clear and sagacious review of the pathology of fever by Professor Welch, of Johns Hopkins University, in his Cartwright Lectures last spring. Study these lectures carefully, and you will find a cautious, painstaking weighing of all the evidence bearing upon the lethal influence of heat elevation in fever, sustained by experimental and clinical data that must be convincing to any unbiassed mind. He says, in summing up (*The Medical Record*, April 28, 1888):

"We find that animals may be kept at high febrile temperature for at least three weeks without manifesting any serious symptoms. The only functional disturbances which could be attributed directly to the influence of the elevated temperature were increased frequency of the respiration and quickened pulse. No definite relation could be established between the variations of arterial tension which occur in fever and the height of the temperature. Although the experiments narrated showed that prolonged high temperature is an element in the causation of fatty degeneration of the heart, they also indicated that other factors, such as infection, are concerned in the production of the lesion. Moreover, experimental evidence was found in support of clinical facts, showing that this alteration may exist without serious interference with the functions of the heart, so that the conclusion seems justifiable that failure of the heart's power, in fever, is *less* an effect of high temperature than of other concomitant conditions. The lessened perspiration, the renal disorders, and the digestive disturbances (with the possible exception of constipation), are referable also chiefly to other causes than the increased temperature. Both experimental and clinical observations strongly support the view, now widely accepted, that the disturbances of the sensorium, which constitute so prominent a part of the group of so-called typhoid symptoms, are dependent in a fair higher degree upon infection or intoxication than upon the heightened temperature. Although no attempt was made to analyze in detail the clinical evi-

dence relating to the effects of high temperature, attention was called to the fact that the absence of all serious symptoms in many cases of relapsing fever, and in the so-called aseptic fever, in spite of prolonged high temperature, strongly support the conclusions derived from the experimental study of the effects of heat upon man and animals. Even in fevers, such as typhoid fever and pneumonia, where the height of the temperature is undoubtedly a most important index of the severity of the disease, there exists no such parallelism between the temperature and the nature and severity of the other symptoms, as we should expect if these symptoms were caused by the increased heat of the body."

I might offer you many clinical observations on this point, but two of these, from men whom you all know and honor, will suffice. In the discussion of a paper on antipyretics which I had the honor to read before the Section on Practice of the New York Academy of Medicine, the lamented Dr. Wesley Carpenter said that :

"With regard to heart failure and degeneration of the muscular fibres of the heart, I had an opportunity, in connection with the pathological department of Bellevue Hospital, to examine microscopically the cardiac muscle in a sufficient number of cases to make it quite evident that it did not occur with the frequency one might be led to expect from reading the writings of the German observers."

Dr. A. L. Loomis said on the same occasion :

"He was not certain, for he had been in the line of observations similar to Dr. Carpenter, that failure of the heart is due to parenchymatous degeneration, of which we have at times heard so much, and it had seemed to him to be due to failure in nervous supply as much as to muscular changes."

This is clear evidence from two pathologists and clinicians, which I might corroborate by other native and foreign testimony.

Since it may be now regarded as an established fact that high temperature, minus infection, does not produce those serious degenerations formerly ascribed to it, we must seek in the infective process, and the ptomaine-intoxication resulting from it, those deleterious effects upon the vital organs which undermine the system and eventually cause death in typhoid fever.

The cold-bath treatment yields the most triumphant results in combating these very effects of the infective and toxic agencies, with whose true entity we have not yet been brought face to face. It has been clearly demonstrated by numerous trustworthy observers that the reflex stimulus aroused by the shock to the extensive peripheral nerve-endings so energizes the nerve-centres which furnish innervation for circulation, respiration, digestion, tissue-formation, and excretion, that the system is enabled to tide over the dangers

which would ensue from failure of these functions. This is the effect of cold bathing in a nutshell; the simple cooling effect on the blood occupies a secondary, though not unimportant, office.

The fact, as shown by Winternitz, Quinquand, and others, is that cold baths actually increase oxidation in health, and that while the skin is cooled and the bloodvessels contracted, the deeper structures are slightly increased in temperature and their vessels dilated. As the opposite condition, viz., dilatation of the arteries and superficial vessels, evidenced by the dicrotic pulse and loss of elasticity and contraction of the vessels, with diminution of the blood-pressure in the inner structures, are manifestations of the fever, the effect of the cold bath appears primarily to be directed against these manifestations, as has been demonstrated by Winternitz's sphygmographic investigations. The vivifying effect upon the nerve-centres referred to produces a vigorous cardiac action, which is evinced by the slower and more regular pulse and an improved tension of the vessels; it improves the appetite and digestion, enabling us to enforce a more perfect nutrition; it deepens and slows the respiration, preventing stasis of bronchial secretions, and obviating pulmonary complications; all the secretions are enhanced; the patient is refreshed and invigorated, and fights the battle for life with all chances in his favor. How different is the aspect of the case under the expectant treatment, and how different is the effect of pure antipyretic medication! The temperature may indeed be reduced, but the stimulating effect upon the nerve-centres and secretion, except on the perspiration, is absent. Vinay (*Lyon Médical*, 1888), who has made some creditable investigations on the subject, tells us that antipyrin does not relieve the delirium, which is in accordance with my own observation; it does not, like the cold bath, increase the flow of urine, by which noxious elements are eliminated. Vinay has confirmed Vogl's observation, that there was a rapid gain of weight after cold baths had reduced the fever.

Kairin, resorcin, and antipyrin diminish the excretion of urea and nitrogen; hence they diminish the excretion of the *materies morbi* through the kidneys, while baths increase it. The liver, in patients dying after treatment by antipyrin, is from 6 to 12.50 grammes heavier than in those dying after cold baths. Indeed, there is an entire absence of effect upon the circulation after antipyrin, an effect which is marked after the cold bath.

Briefly stated, cold baths are antifebrile remedies, while antipyretics are simply antithermic. Hence the superiority of the former over treatment by antipyretic medication. A mixed treatment is advocated by Liebermeister and Ziemssen. The latter, who is one of the staunchest defenders of the cold bath (not, however, as an antipyretic alone), regards the gradually lowered bath as better adapted to the exigencies of private and civil practice, while he concedes that the results of Vogl and others, in military practice, leave nothing to be desired. Liebermeister insists upon the cold bath as an antipyretic to produce remissions, and orders quinine to render these more enduring. Naunyn, on the other hand, uses a modified and more temperate bathing, rejecting all antipyretic medication.

The statistics of these different methods have been presented to you, and I have now added as briefly as possible the reasons why the results are more favorable in the cold bath treatment first suggested by Brand in 1861. The latter is thus demonstrated to be the ideal treatment for typhoid fever, and that, whenever a deviation is made from it, Jürgensen's opinion, given at the Congress in London, is sustained, that "whenever he has attempted to deviate from the rigorous cold water treatment, he was compelled to return to it in order to obtain the best results." This then is the standard for our guidance. It is to be carried out as follows: Whenever the temperature reaches over 103° F. in the rectum, the patient is placed in a bath of 65° F. A half bath of this temperature, with affusions three or five degrees lower, is sometimes used. This is to be repeated every three hours, so long as the temperature is not reduced below 103° F.; and the patient is to remain fifteen minutes each time. Patient should be gently rubbed while in the bath; when he is removed from it, he should be wrapped in a coarse linen sheet, the extremities dried and wrapped in a blanket, and a stimulant may be administered. In extreme cases of muttering delirium, or when there is decided adynamia, a stimulating bath should be administered, even if the temperature is below 103° F. This consists of a half bath in warm water with cold affusion. A wet compress should be kept over the abdomen constantly when the patient is in bed. Judgment must be exercised to adapt the baths to the condition of the patient and stage of the disease. The Ziemssen bath, which may be used when the patient, his friends, or the doctor is timid, consists of submerging the

patient into a partial bath, about 9° or 10° F. below his temperature, whenever the latter reaches 103° F. in the rectum. While two assistants gently play water over him and rub him, cold water is added gradually near the feet, until the temperature is lowered to 68° F. He remains altogether twenty to thirty minutes, or until there is decided chilliness and chattering of the teeth. (Simple pallor of the skin and smallness of the pulse do not indicate removal.) He is now removed and wrapped in a dry sheet. The bath is repeated as often as the temperature reaches 103° F. This bath also requires judgment, as does every valuable remedial measure. The clinical picture of a case of typhoid fever treated by the cold bath, as given by Brand and Ziemssen, and as I have personally observed, indicates that the whole aspect of the case is changed; the patient is bright, cheerful, eats well, sleeps well, all his functions are properly performed, and, what is most important, complications are prevented. Even disease of the intestinal glands does not go beyond infiltration, according to Brand, if the case be treated early.

Ziemssen and Vogl furnish from personal experience a description of the beneficial effect of cold baths upon themselves when they suffered from typhoid fever.

We must not be deterred by timidity from rigorously executing the plan of three-hourly bathing so long as the temperature is 103° in the rectum, or when the sensorium is deeply depressed with a lower temperature. Even sleep should not prevent resort to the thermometer and bath, if needed. The object of this treatment, it must be understood, is not to subdue the temperature, but to vivify and energize the vital organs, and thus insure a vigorous resistance to the toxic influences arising from the infective processes. This is the great aim to be kept steadily before us.

In presenting this apparently heroic treatment to the reconsideration of the profession, I am aware that there are serious objections to its general adoption, which seem almost insurmountable. The profession must first be educated to abandon the policy of expectancy, whose aim it is to allow the fever to pursue its own course:

1. The annoyance to the patient is not in accordance with the expectant plan, whose object it is to avoid all disturbance of the patient for remedial purposes. So long as we had only an inefficient, if not injurious, medicinal treatment, it was wise to avoid disturbing sleep. But in a severe case of typhoid fever it is as

important to disturb sleep when the rise of temperature indicates the necessity, as it is in opium-poisoning when stupor supervenes. Indeed, the treatment is somewhat analogous, inasmuch as the object is to arouse the nerve-centres, and keep them aroused (though not continuously as in the latter) until the toxæmia has passed away.

2. The nurses and friends of the patient will be reluctant to adopt so active a measure. If the physician is convinced that he is right, he must insist upon his directions being followed.

3. The idea that the reduction of temperature is the leading object of the cold bath, and the much greater facility of accomplishing this object by antipyrin and antifebrin, may deter many from adopting the former. The fallacy of this course has been demonstrated.

4. Timid persons may be alarmed by the patient's pallor, small pulse, and complaints of chilliness while in the cold bath. But if properly administered, with chafing of the body and limbs, these effects will be counteracted to some extent. Reaction after removal will soon reassure the attendant, and embolden him to order a regular repetition.

5. A slovenly application of the bath, or the substitution of some other method—packing, sponging, sprinkling, etc.—will fail and cause discouragement. It must be remembered this is not *cold bathing*. A small experience, personal or from hearsay, which may have been unfavorable in one, two, or several cases, will deter some from adopting the energetic cold bathing. An intelligent hospital physician told me yesterday that he was discouraged from the cold-bath treatment by witnessing, while an interne in one of our hospitals, the death of a patient after being placed on a Kibbé cot, wrapped in a sheet, and *sprinkled with ice-water* for a considerable time. This method is not recommended by any author whom I have quoted, nor is it even to be compared to Currie's cold affusion, in which the stimulus of impingement of a large mass of cold water upon the surface favors rapid reaction, with its resultant stimulating effect on the nerve-centres.

The only modification of the general cold bath admissible is the stimulating affusion advised by Brand in cases threatening heart failure and delirium. This is a warm half-bath, with cold affusions over the head, chest, and back. (One important point is that the

tub should always be brought to the bedside, to avoid unnecessary disturbance of the patient.)

6. The experience with cold bathing in England and America, where it has never found favor, has been too small to afford a proper estimate of its value. Dr. Bristowe, of St. Thomas's Hospital, opposes it; he says:

"My personal experience in this treatment is not extensive, and for some years I have rarely, if ever, resorted to it. I have undoubtedly seen patients apparently benefited and making a good recovery. But I have never felt satisfied that the benefit was real."

Dr. Austin Flint published, in 1882, a lecture which exercised a potent influence in this country. He treated seventeen cases in Bellevue Hospital. "In a few cases the cold bath of 80° F., gradually reduced to 65°, was employed, but was discontinued on account of the inconvenience." His conclusion was that the antipyretic treatment neither increased nor diminished the mortality, which was four out of these seventeen cases.

Compare these statistics with those offered by Brand, and their utter insignificance for purposes of deduction is apparent. The prejudice existing against the cold-bath treatment is illustrated by a passage in *Strümpell's Practice*, a translation of which is now used as a text-book in the College of Physicians and Surgeons of New York. Strümpell says, with his usual fairness:

"There is at present no other single method of treating typhoid fever which has so numerous and evident advantages for the patient. We regard it as the duty of every physician who undertakes to treat a severe case of typhoid fever to try his best to have the bath employed."

The editor and translator (a noted hospital physician) endeavors to neutralize this recommendation by stating that,

"notwithstanding the high praise bestowed on the cold-bath treatment in Germany it has never become popular,"

and quotes Senator's statistics in support of his position. This is a serious misstatement, because Senator distinctly says (*Berl. klin. Wochensch.*, 1885, p. 758):

"If my essay has made the impression that I oppose cold baths, I must have expressed myself very badly."

7. One objection to the strict execution of Brand's method is doubtless the difficulty, if not impossibility, of treating patients

before the fifth day. Indeed, this can only be done in military hospitals or in epidemics. Every suspicious case should be subjected to the bath. At any rate, the more nearly we approach the high standard of strict bathing, the more nearly we will approach the low mortality. Hence the earlier the baths are resorted to, the more strictly in accordance with the directions regarding their temperature and frequency, the more completely will the toxic processes be controlled and the mortality be reduced.

In conclusion, let me urge upon you to weigh carefully the evidence I have so imperfectly presented, and to seek in the literature of the past two years further information ere you decide to reject it and to continue the present fatal expectant-antipyretic course of treatment. As I have elsewhere said: The history of medicine does not present a parallel to the application of statistics for the elucidation of a question of therapeutics which Brand has presented and which I have amplified. The evidence is before us, clear and incontrovertible. Upon our conscientious, unbiassed, and fearless judgment and action rests the weal or woe of those who commit their lives into our keeping.